**Syllabus**

STAT 579-0001 Practice of Bayesian Statistics  
Northern Illinois University Spring, 2016

**Instructor:** Duchwan Ryu  
Office: 361E  
Office Hours: MW 3-4 (feel free to ‘drop in’)  
Phone: 815-753-6778  
E-mail: dryu@niu.edu

**Class:** MW 12:30 pm - 1:45 pm (3 credit hours) at DuSable Hall 256

**Textbook:** R. Christensen, W. Johnson, A. Branscum, and T. Hanson (2010). *Bayesian Ideas and Data Analysis - An Introduction for Scientists and Statisticians*, Hall / CRC Press.

**References:**

**Course Description:**

- Introduction to Bayesian data analysis and applications with appropriate software. Topics include Bayes Theorem, discrete and continuous single-parameter models, comparison of Bayesian and non-Bayesian inference, multiparameter and hierarchical models, Bayesian computation including Markov chain simulation, mixture models, Bayesian sample-size determination and applications to modeling data from a wide variety of areas in business, engineering, and science.

- Selected material from chapters 1 to 7 and 9 of the Text and an introduction to the R and WinBUGS/OpenBUGS softwares.

- PRQ: STAT 350 and STAT 573, or consent of division.

**Intended Learning Outcomes:**

- Capacity to formulate scientific problems within the Bayesian statistical paradigm.

- Knowledge of Bayesian data analysis methods.
• Practical working knowledge of R and WinBUGS to perform Bayesian data-analysis.

• Experience with a variety of statistical problems arising in real world applications.

• Knowledge of the key commonalities/differences between the Frequentist (Classical) and the Bayesian statistical paradigms.

Assessment:

• Homework: Light homework will be assigned on every other Wednesday.

• Exams: There will be two in class exams, mid-term and final exams (comprehensive), which are close-book and closed-notes with two formula sheets for each.

• Project: There will be a final project to be submitted with the final exam for each team (desirably 1 grad and 1 undergrad).

• Grade: The course grade will be based on 100 points with Homework (30), Mid-term (30), Final (30) and Project (10).

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A:90-100</td>
<td>A-:87-89</td>
</tr>
<tr>
<td>B</td>
<td>B+:84-86</td>
<td>B:80-83</td>
</tr>
<tr>
<td>C</td>
<td>C+:74-76</td>
<td>C:70-73</td>
</tr>
<tr>
<td>D</td>
<td>D:60-66</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>F:Below 60</td>
<td></td>
</tr>
</tbody>
</table>

Course Resources: Course website is available on Blackboard.

Course Policies:

• You may receive course information by email through MyNIU or Blackboard. Not checking on a daily basis, or periodic clean-up of your in-box, etc., in regard to your NIU-email are not acceptable excuses for you not to follow my instructions. Setting up to forward email from your NIU-email to other preferred email addresses, if any, may be helpful.

• Generally students are expected to attend the lectures, as the covered materials may not be chosen straightly from the text book. In the case of an absence, please be advised that the student assumes the responsibility for anything that (s)he fails to receive from the lecture. Make a friend or two in this class just in case you are unable to attend the lectures.
• Late assignments are acceptable but the late final project is not. It is the responsibility of
the student to keep track of which assignments are due when.

• Students are expected to work on the exams independently. Violation of the rules will be
handled according to NIU policies. The acceptance of a make-up exam will be determined
based on each individual case, if there is a legitimate reason such as a medical emergency.
Proof of the event needs to be provided. A make-up exam is intended to be similar in terms
of difficulty, but the instructor could not guarantee the full credit.

• Please note that it is unlikely that all of your homework will be graded and returned to you
before the exams. You may want to make copies of your homework before turning it in.

• Please note that a grade of incomplete (I) may be considered for students who are passing
the course, but cannot complete the course due to documentable health or family reasons.
A grade of incomplete will not be assigned to anyone who is not passing the course at the
time of the request.

• Please check all your scores on the NIU Blackboard upon receiving them. Any discrepancies
between your record and the Blackboard must be e-mailed to me dryu@niu.edu no later than
one week from the time you receive your scores; after that the Blackboard data will be final.

• Unless you are recording the lectures, ALL electronic devices you bring in to the class, except
calculators and cell phones, must remain switched off during the entire lectures. Distractions
like reading newspapers must be avoided during the lectures. You will be asked to leave the
class if you violate any of these regulations after one warning.

• In STAT 579, home-work, quizzes, exams, etc., may be given that are more challenging
relative to what I give in STAT 479, per policy of the graduate school.

• The instructor reserves the right to amend the syllabus at any time. Changes will be an-
nounced.

Accessibility: Northern Illinois University is committed to providing an accessible educational envi-
ronment in collaboration with the Disability Resource Center (DRC). Any student requiring an
academic accommodation due to a disability should let his or her faculty member know as soon as possible. Students who need academic accommodations based on the impact of a disability will be encouraged to contact the DRC if they have not done so already. The DRC is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 (V) or drc@niu.edu.

**Academic Integrity:** Policies on Academic Integrity, Attendance and Accessibility statement is available at

http://www.niu.edu/stat/courses/pdfs/Accessibility_Statement.pdf.

**Proposed Course Schedule:**

- **Weeks 1-7**: Chapters 1–4
- **Weeks 8**: Mid-term
- **Weeks 9-14**: Chapters 5-7, 9 (8)
- **Weeks 15**: Final Project (May 9th)